



Annual Communicable Disease Morbidity Report 2018

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ADDITIONAL REPORT INFORMATION

For in-depth information on STD or HIV-related morbidities, please see the City of Long Beach 2017 STD Surveillance Annual Report.¹

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Communicable Disease Control Program (CDCP) Annual Morbidity Report 2018

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OVERVIEW

The purpose of this report is to:

1. Summarize communicable disease trends over time.
2. Describe the burden of communicable diseases in Long Beach, California.
3. Highlight the Communicable Disease Control Program's key activities and response efforts in 2018.

BACKGROUND

Diseases and conditions on the *Reportable Disease and Conditions* list are required to be reported to the Health Department by health care providers, healthcare facilities, and laboratories based on California Code of Regulations, Title 17, Section 2500. This allows the Health Department to monitor, investigate, and control diseases of public health concern and prevent further spread. The collection and distribution of disease data are core functions of public health and provide important information on the burden of communicable diseases in Long Beach.

METHODS

DATA SOURCES

All communicable disease morbidity data in Long Beach is entered into the California Reportable Disease Information Exchange (CalREDIE), which is a web-based system maintained by the California Department of Public Health (CDPH) for local health departments to conduct disease investigations and surveillance. The data entered in CalREDIE is processed daily and made available to local health departments for analysis through the web-based Data Distribution Portal (DDP). All morbidity data used in this report was extracted from the DDP and included estimated illness onset dates from January 1, 2014 through December 31, 2018.

In addition to CalREDIE, the carbapenem-resistant Enterobacteriaceae (CRE) data is extracted from the National Healthcare Safety Network (NHSN). This is the nation's most widely used healthcare-associated infection tracking system, and is maintained by the Centers for Disease Control and Prevention (CDC). Acute care hospitals (ACHs) in California report CRE data into NHSN monthly. CRE morbidity data was extracted from NHSN by specimen collection date from January 1, 2017 through December 31, 2018.

ONSET DATES

Estimated illness onset date is the date closest to when symptoms first began. For some cases, an illness onset date was not reported, therefore an estimated date was selected based on the earliest available date which may have been either laboratory specimen collection date, laboratory result date, diagnosis date, date reported to the health department, or date of death.

POPULATION

The U.S. Census American Community Survey (ACS) 5-year estimates (2014-2018)² were used for population data to calculate incidence rates to allow for comparisons across different jurisdictions. Cases attributed to Long Beach in this report are based on the individual's city of residence. This does not necessarily mean that the exposure occurred in Long Beach. This report only includes cases who were residents of Long Beach, CA at the time of diagnosis. If an individual was experiencing homelessness and sought care in Long Beach without any additional housing information, they were considered to be Long Beach residents in this report.

CASE DEFINITIONS

A case definition is used to define a disease for public health surveillance purposes. It allows health departments to classify and count cases consistently across jurisdictions. These definitions are set by the Centers for Disease Control and Prevention (CDC), the California Department of Public Health (CDPH), and the Council for State and Territorial Epidemiologists (CSTE).³ Reported diseases are classified as either "Confirmed", "Probable", "Suspect", or "Not a Case."

Cases that met criteria for only Confirmed were included in this report for the following diseases: amebiasis, botulism (all types), carbapenem-resistant Enterobacteriaceae (CRE), coccidioidomycosis, hepatitis A, B, and C (acute), invasive *haemophilus influenza* (all serotypes), legionellosis, listeriosis, measles, meningococcal disease, syphilis, tuberculosis, and typhoid fever.

Cases that met criteria for Confirmed and Probable were included in this report for the following diseases: brucellosis, campylobacteriosis, chikungunya, cryptosporidiosis, dengue, giardiasis, lyme, malaria, mumps, salmonellosis, shiga-toxin producing *E. coli* (STEC) including *E. coli* 0157, shigellosis, vibrio (non-cholera), West Nile virus, and Zika virus.

Cases that met criteria for Confirmed, Probable, and Suspect were included in this report for the following diseases: chlamydia, gonorrhea, pertussis, syphilis, and typhus.

DATA LIMITATIONS

Case counts for each disease are based on the number of reported cases. The number reported does not necessarily represent the exact morbidity, but the number of people who sought care, were tested, and whose labs were reported to the Health Department. This may result in an underestimation of the true number of cases, however the reports received allowed for an estimation of what is occurring and help identify trends and detect outbreaks.

Morbidity rates are subject to random variation. Diseases with a small number of cases reported per year may have unstable rates. The National Center for Health Statistics uses the relative standard error greater than 25% as the cut-off for rate reliability. Therefore, rates for case numbers less than 20 do not meet the minimum requirement to generalize and should be interpreted with caution.

Race and ethnicity are self-reported in this dataset and often the information is incomplete for a significant number of cases. Therefore, incident rates and case counts by race and ethnicity were not included in this report.

Table of Notifiable Diseases

Table 1. Reported Cases and incidence rates (per 100,000 population) of selected notifiable diseases by year.

DISEASE	2014		2015		2016		2017		2018	
	Cases	Rate*	Cases	Rate*	Cases	Rate*	Cases	Rate*	Cases	Rate*
Amebiasis	4	0.9	6	1.3	8	1.7	3	0.6	3	0.6
Botulism (all types)	0	0.0	1	0.2	0	0.0	1	0.2	0	0.0
Brucellosis	0	0.0	0	0.0	0	0.0	0	0.0	1	0.2
Campylobacteriosis	63	13.4	70	14.9	83	17.7	59	12.5	91	19.3
Carbapenem-resistant Enterobacteriaceae (CRE)	**	**	**	**	**	**	35	8.2	56	9.8
Chikungunya	2	0.4	2	0.4	1	0.2	0	0.0	0	0.0
Chlamydia	2398	511.7	3,346	711.6	3854	820.4	4287	911.2	3971	844.0
Coccidioidomycosis	24	5.1	41	8.7	20	4.3	21	4.5	13	2.8
Cryptosporidiosis	11	2.3	5	1.1	9	1.9	17	3.6	8	1.7
Dengue	3	0.6	5	1.1	0	0.0	1	0.2	3	0.6
Giardiasis	18	3.8	17	3.6	33	7.0	34	7.2	32	6.8
Gonorrhea	685	146.2	980	208.4	1488	316.7	1676	356.2	1784	379.2
Invasive <i>Haemophilus influenzae</i>	2	0.4	0	0.0	2	0.4	1	0.2	2	0.4
Hepatitis A	5	1.1	3	0.6	4	0.9	0	0.0	0	0.0
Hepatitis B, acute	3	0.6	4	0.9	3	0.6	3	0.6	4	0.9
Hepatitis C, acute	1	0.2	5	1.1	2	0.4	1	0.2	1	0.2
Legionellosis	7	1.5	10	2.1	7	1.5	15	3.2	7	1.5
Listeriosis	4	0.9	0	0.0	0	0.0	2	0.4	1	0.2
Lyme Disease	2	0.4	1	0.2	1	2	2	0.4	0	0.0
Malaria	2	0.4	2	0.4	0	0.0	1	0.2	2	0.4
Measles	0	0	2	0.4	0	0.0	0	0.0	0	0.0
Meningococcal Disease	0	0	0	0.0	8	1.7	2	0.4	0	0.0
Mumps	0	0	2	0.4	1	0.2	2	0.4	4	0.9
Pertussis	181	38.6	36	7.7	13	2.8	19	4.0	29	6.2
Salmonellosis (other than typhoid)	63	13.4	46	9.8	50	10.6	46	9.8	71	15.1
Shiga Toxin-producing <i>E.coli</i>	4	0.9	10	2.1	6	1.3	11	2.3	31	6.6
Shigellosis (all groups), Total	26	5.5	25	5.3	43	9.2	36	7.7	72	15.3
<i>S. flexneri</i>	14	3.0	14	3.0	22	4.7	16	3.4	40	8.5
<i>S. sonnei</i>	10	2.1	11	2.3	21	4.5	9	1.9	15	3.2
Shigellosis, Unspecified	2	0.4	0	0.0	0	0.0	11	2.3	17	3.6
Syphilis, Early	183	39.1	273	58.1	305	64.9	344	73.1	357	75.9
Tuberculosis	30	6.4	41	8.7	30	6.4	23	4.9	26	5.5
Typhoid Fever	3	0.6	0	0.0	0	0.0	0	0.0	0	0.0
Typhus	8	1.7	11	2.3	20	4.3	11	2.3	20	4.3
Vibrio (Non-Cholera)	1	0.2	2	0.4	2	0.4	1	0.2	4	0.9
West Nile Virus Infections, Total	53	11.3	14	3.0	4	0.9	15	3.1	0	0.0
West Nile Fever	12 ⁺	2.6	4	0.9	1	0.2	2	0.4	0	0.0
West Nile, Neuroinvasive	37	7.9	8	1.7	2	0.4	13	2.8	0	0.0
West Nile, Asymptomatic	4	0.9	2	0.4	1	0.2	0	0.0	0	0.0
Zika Virus	**	**	**	**	6	1.3	1	0.2	4	9

*U.S. Census Bureau, American Community Survey (ACS) 5-Year Estimates 2013-2017.

**Zika Virus was made reportable in 2016 and CRE was made reportable in 2017.

⁺Includes one case that was reported as West Nile Virus, Unspecified in 2014. West Nile Virus, Unspecified is no longer used as a condition classification

Note: Any indicators with <20 cases do not meet the requirement for a minimum degree of accuracy outlined by the National Center for Health Statistics. Rates are included for reporting purposes only.

2018 YEAR IN REVIEW

INTRODUCTION

The following reports on flea-borne typhus, West Nile virus, carbapenem-resistant Enterobacteriaceae (CRE), and shigellosis highlight just some of the key investigations, outbreaks, and activities which were conducted and led by the Communicable Disease Control Program in 2018. While the diseases highlighted here do not necessarily represent those with the highest burden in Long Beach, they were chosen because of noted changes in disease trends or because they garnered significant public interest.

FLEA-BORNE TYPHUS

Flea-borne typhus, also known as murine typhus, has been endemic in the City of Long Beach since it was first detected in 2006. The disease is caused by the bacteria *Rickettsia typhi* and possibly *Rickettsia felis*. In the United States, most flea-borne typhus cases occur in California, Texas, and Hawaii. In California, flea-borne typhus is primarily found in Los Angeles and Orange counties. Humans can become infected with typhus by coming into contact with fleas that have fed on infected animals such as rats, opossums, or stray cats. Symptoms include high fever, headache, chills, muscle pain, and rash. People with typhus are often hospitalized, however most recover once treated with antibiotics. Death from typhus is rare. There is no vaccine to protect against typhus. The best way to prevent typhus is to avoid direct contact with fleas by using flea control products on pet dogs and cats, and taking measures to prevent rats, opossums, and community cats from living around the home. This can be done by trimming and removing plants, keeping garbage containers covered, keeping pet food indoors, and placing screens on windows and crawl spaces to prevent entry of animals.⁴

In 2018, there were 20 cases of typhus reported in Long Beach, with a rate of 4.3 per 100,000 population (Figure 1). Cases are typically seen throughout the year but tend to increase in the summer months. In 2018, however, there were no reported cases of typhus until June, followed by a sudden increase in cases in July, leading to one of the highest incidence years in Long Beach (Figure 2).

Figure 1: Flea-borne Typhus by Year (2012-2018)

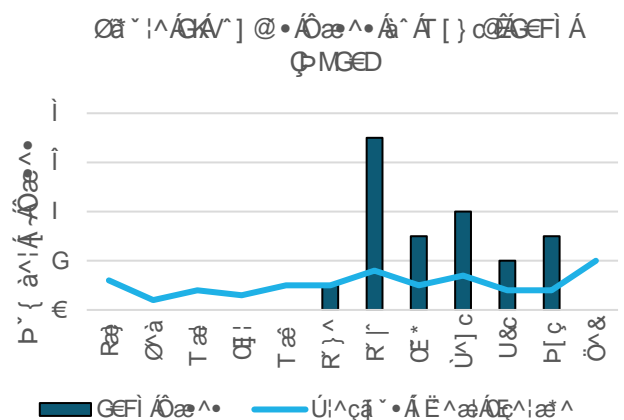
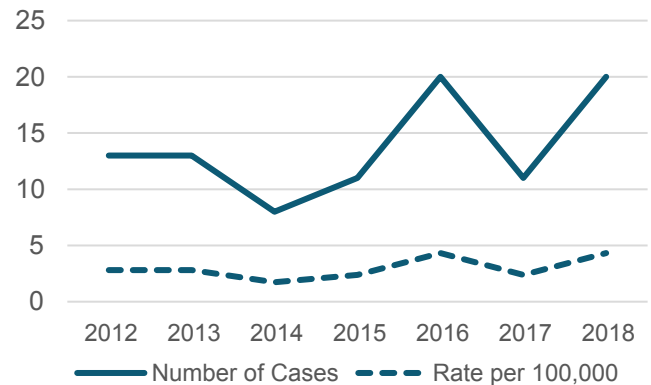
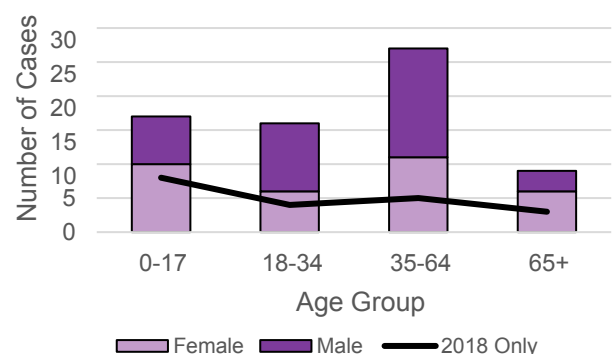


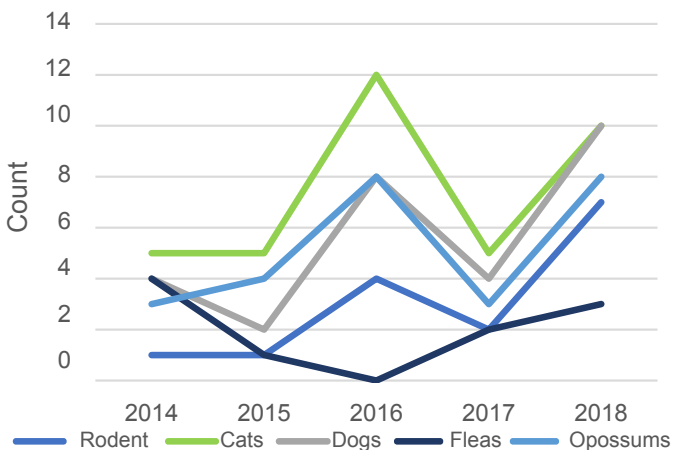
Figure 3: Typhus Cases by Gender and Age, 2014-2018 (N=69)



From 2014 to 2018, 39% of cases were 35 to 64 years old, and 25% were less than 18 years. In 2018 alone, 40% of cases were less than 18 years old, and the median age was 31.5 years (Figure 3). The age group with the fewest number of cases were those 65 years and older. In 2018, 70% of cases were hospitalized. These cases were hospitalized for an average of six days. No deaths were reported.

Exposure trends have been consistent each year, and most cases reported exposure to animals around the home. In 2018, observing cats and dogs around the home were the most commonly reported risk factor (Figure 4).

Figure 4: Reported Exposure Types by Year

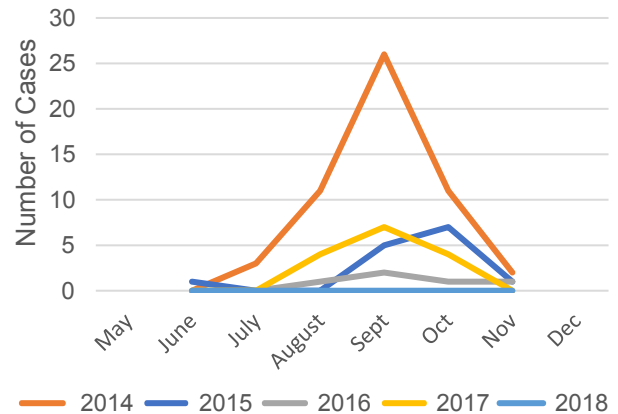


WEST NILE VIRUS

West Nile virus (WNV) is an arbovirus which is spread to people by infected mosquitoes. Mosquitoes become infected when they feed on infected birds. The majority of cases in Long Beach occur from June to October (Figure 5).

Most people who become infected with WNV do not develop any symptoms, however, approximately 1 in 5 people who are infected will develop a fever with symptoms such as headache, body aches, joint pains, vomiting, diarrhea, or rash.⁵

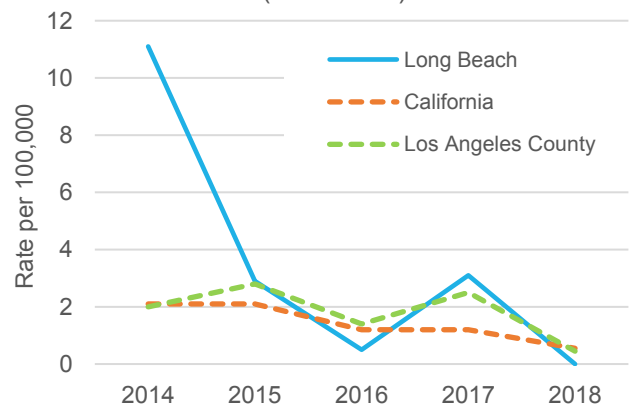
Figure 5: West Nile Virus Cases by Month in Long Beach, 2014-2018



West Nile virus has also been found to cause neurologic illness such as encephalitis or meningitis in approximately 1% of those infected. Anyone living in an area where WNV is present can become infected, however people over the age of 60 have a higher likelihood of becoming sick and are more likely to develop serious symptoms.⁵

There were no reported WNV cases in Long Beach in 2018, and statewide activity was lower compared to past years (Figure 6).⁶ This was the first year since 2011 that Long Beach had no human cases of WNV. WNV activity can vary each year due to factors such as drought, rain fall, climate change, and fluctuation of bird populations.^{7,8}

Figure 6: WNV rate by Year (2014-2018)



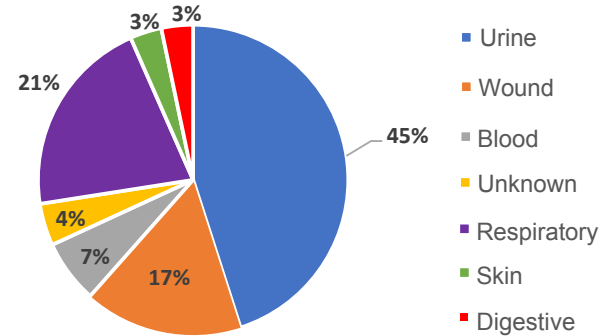
CARBAPENEM-RESISTANT ENTEROBACTERIACEAE (CRE)

Carbapenem-resistant Enterobacteriaceae, also known as CRE, refers to the Enterobacteriaceae family of bacteria that are difficult to treat because they have high levels of resistance to antibiotics. The two most commonly associated organisms associated with CRE infections are *Klebsiella pneumoniae* and *E. coli*. Infections of CRE are typically acquired in healthcare settings and transmitted from person-to-person through the hands of healthcare personnel or contaminated medical devices, such as catheters or ventilators.

The symptoms of CRE vary depending on what part of the body is infected, but may include urinary tract infections, sepsis, pneumonia, and fever. Treatment of CRE is difficult because there are a limited number of antibiotics that will work against it. There have even been strains identified in the U.S. that are resistant to all known antibiotics.^{9,10}

To better understand the disease burden in Long Beach, the City Health Officer mandated that skilled nursing facilities and acute care hospitals must report CRE cases to public health effective January 2017. In addition, the Health Department partnered with the California Department of Public Health (CDPH) to develop a year-long collaborative around CRE prevention that spanned from 2018-2019. The participants consisted of acute care hospitals and skilled nursing facilities throughout Long Beach. The objectives of the collaborative were to improve surveillance by ensuring timely reporting of CRE cases, increase knowledge of recommended prevention strategies within healthcare facilities, and enhance the communication between facilities to ensure that patients transferred with CRE are transferred using appropriate infection prevention and control precautions. The CRE prevention collaborative consisted of quarterly learning and discussion sessions and an onsite infection prevention assessment.

Figure 7: CRE Cases by Specimen Source 2017-2018

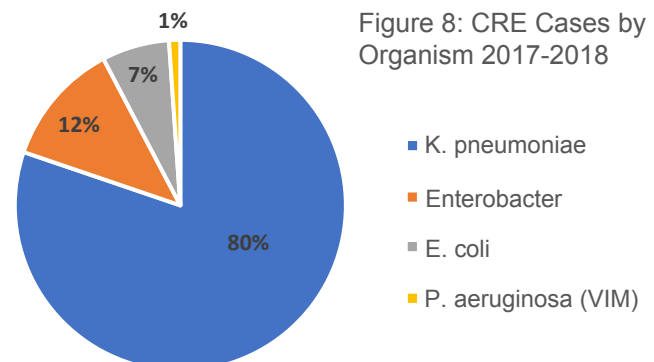


The interactive sessions allowed participating facilities the opportunity to discuss and share best practices, challenges, and lessons learned regarding CRE prevention.

The number of reported cases of CRE increased from 35 in 2017 to 56 in 2018, which represents a 60% increase. This increase may be due to the fact that many facilities did not immediately become aware that CRE was reportable. The average number of CRE cases reported per month was 3 in 2017 and 5 in 2018. The median age of the cases reported from 2017-2018 was 67 and the ages ranged from 28-99 years old. Nearly half (48%) of all cases reported were 58 to 72 years old.

CRE was most commonly identified in urine (45%), followed by wound specimens (17%) (Figure 7). The most commonly associated organism with the reported cases of CRE from 2017-2018 was *K. pneumoniae* at 73% (Figure 8).

Figure 8: CRE Cases by Organism 2017-2018



SHIGELLOSIS

Shigellosis is an illness caused by the bacteria *Shigella*. There are four main serogroups, however *S. flexneri* (Group B), and *S. sonnei* (Group D) are the most commonly identified in Long Beach.

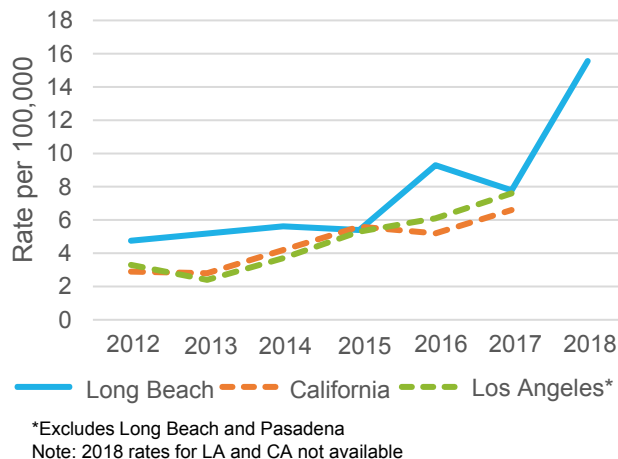
Symptoms of shigellosis include diarrhea, which is often bloody, fever, nausea, and vomiting, and occur about 3 to 4 days after exposure to the bacteria. Humans are the only host and the bacteria is spread through fecal-oral transmission when individuals fail to wash their hands after using the restroom. This can occur through consumption of food or liquids contaminated by an infected person, or exposure to feces of an infected person during sexual contact. Ingesting even a very small amount can make someone sick.¹¹

The best way to prevent the spread of shigellosis is hand-washing, especially in crowded areas and when preparing food for others. In order to control the spread of *Shigella*, individuals with shigellosis who are in a sensitive occupation or situation (i.e. healthcare workers, food handlers, daycare attendees) are removed from high-risk activities until their stool specimens are negative when tested by the Long Beach Public Health Laboratory.

In 2017, the CSTE case definition for shigellosis was revised to include positive culture-independent diagnostic tests (CIDT) as probable cases.

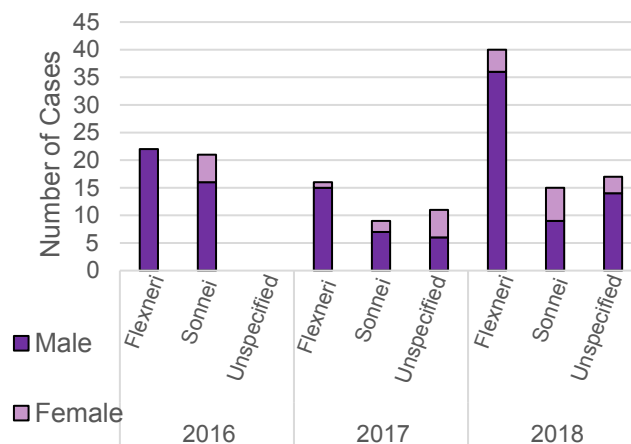
The incidence rate of shigellosis cases in Long Beach increased from 7.8 per 100,000 population in 2017 to 15.6 per 100,000 population in 2018 (Figure 9). Rates for CA and LA County have not yet been released for 2018, but CDPH monthly summaries showed an increase in the number of shigellosis cases reported in California and LA County as well.^{12,13}

Figure 9: Shigellosis Rates by Year
2012-2018



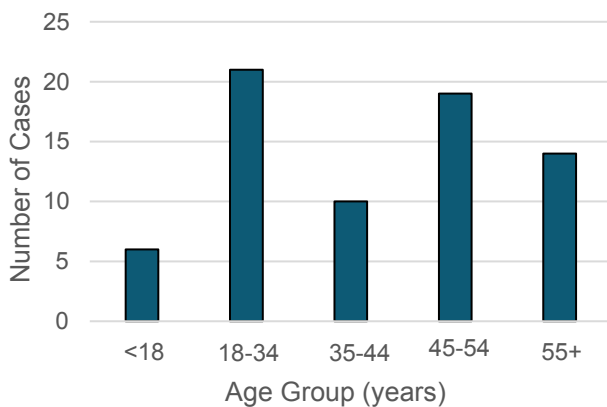
In recent years, there has also been changes in the number of reported *Shigella* by serogroups, however, in 2018 there was a particularly sharp increase in *S. flexneri* cases in Long Beach. From 2017 to 2018, there was a 150% increase in the number of *S. flexneri* cases reported. The rise in unspecified shigellosis cases is likely due to the change in the probable case definition to include positive CIDT results.

Figure 10: Shigella serogroup by Year and Gender



In 2018, approximately 82% of shigellosis cases were male, and about 30% of cases in 2018 were reported as men who have sex with men (MSM; Figure 10). The highest number of cases in 2018 by age group was seen in those 18 to 34 years old (30%), followed by those 45-54 years old (20%; Figure 11).

Figure 11: Shigellosis Cases by Age Group, 2018



There has also been an increase in shigellosis cases among persons experiencing homelessness (PEH). In the summer of 2018, a *Shigella flexneri* outbreak was detected among PEH in Long Beach. There were nine confirmed cases associated with the outbreak and an additional 12 suspect cases were identified through active surveillance during outreach in the encampments. Teams from the Health Department, Long Beach Fire Department HEART Team, Long Beach Police Department Quality of Life Team, and Parks, Recreation, and Marine (PRM) worked closely to implement control measures. These efforts included deep cleaning of public bathrooms, education to those living in the encampments, outreach to shelters, and installation of soap in several park restrooms, which is not routine maintenance. Although this outbreak was controlled quickly, sporadic cases of shigellosis among PEH are expected to continue.

CONCLUSION

The Health Department continuously works to stop the transmission of communicable diseases in Long Beach. This report will be published once a year and will highlight significant activities and investigations that occur throughout the year in addition to a full summary of disease case counts and rates for the City of Long Beach.

REFERENCES

1. STD/HIV Surveillance Annual Report 2017. Long Beach Department of Health and Human Services, 2018. <http://www.longbeach.gov/globalassets/health/media-library/documents/planning-and-research/reports/hiv-reports/final-2017-hivstd-surveillance-report-final-10-12-18>
2. U.S. Census Bureau. 2013 – 2017 American Community Survey (ACS) 5-year Estimates.
3. Surveillance Case Definitions. National Notifiable Disease Surveillance System (NNDSS), Centers for Disease Control and Prevention (CDC). <https://wwwn.cdc.gov/nndss/case-definitions.html>
4. "Flea-borne (murine typhus)." Typhus Fevers. Centers for Disease Control and Prevention. <https://www.cdc.gov/typhus/murine/index.html>
5. "The California Department of Public Health West Nile Virus Website." Accessed April 19, 2019. <http://westnile.ca.gov/>.
6. "Reported incidence of West Nile virus illness-California," 2012-2017. California Department of Public Health. <http://westnile.ca.gov/reports.php>
7. Paz, Shlomit. "Climate Change Impacts on West Nile Virus Transmission in a Global Context." *Philosophical Transactions of the Royal Society B: Biological Sciences* 370, no. 1665 (April 5, 2015). doi:10.1098/rstb.2013.0561.
8. Paz, Shlomit et al. "Environmental Drivers of West Nile Fever Epidemiology in Europe and Western Asia -A Review." *International Journal of Environmental Research and Public Health* August 2013; 10(8): 2543-3562. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3774453/>
9. "Carbapenem-resistant Enterobacteriaceae in Healthcare Settings." *Healthcare-associated Infections*. Centers for Disease Control and Prevention. <https://www.cdc.gov/hai/organisms/cre/index.html>
10. "Carbapenem-resistant Enterobacteriaceae (CRE)." *Healthcare-Associated Infections (HAI) Program*. California Department of Public Health. <https://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/Carbapenem-resistantEnterobacteriaceae%28CRE%29.aspx>
11. "Shigella - Shigellosis." Centers for Disease Control and Prevention. <https://www.cdc.gov/shigella/index.html>
12. CDPH Infectious Disease Branch (IDB) Yearly Summaries of Selected Communicable Diseases in California, 2011-2017. Surveillance and Statistics Section – Infectious Disease Branch Division of Communicable Disease Control – Center for Infectious Diseases, February 2019. <https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/YearlySummariesofSelectedCommunicableDiseasesinCA.pdf>
13. 2018 Year-end Monthly Summary Report of Selected California Reportable Diseases. California Department of Public Health, April 2, 2019. <https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/2018Year-endIDBCaseCountsbyMonthandLHJ.pdf>